

Testimony of

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before

Energy and Technology Committee

March 15, 2011

regarding

Committee Bill No. 1

An Act Concerning Connecticut's Energy Future

## *Introduction*

The Connecticut Center for Advanced Technology, Inc. ("CCAT"), offers this testimony for Committee Bill No. 1 - An Act Concerning Connecticut's Energy Future.

CCAT is a nonprofit corporation that provides services and resources to entrepreneurs and businesses through collaboration with industry, academia, and government. The Energy Initiative of CCAT has been established to improve the economic competitiveness of the region through solutions that lower energy costs and increase long-term energy reliability. CCAT administers the Connecticut Hydrogen-Fuel Cell Coalition; administers the Connecticut Biodiesel Program; provides assistance to small and medium sized manufacturers to assess opportunities for the application of advanced generation technologies, such as combined heat and power systems; undertakes energy planning for Connecticut municipalities and institutions such as the University of Connecticut; administers the US DOE Hydrogen Fuel Cell educational outreach program for the New England states, New York, and New Jersey; and administers the US Small Business Administration Northeast Electrochemical Energy Storage Cluster for New England and New York.

This Bill contains many components that are favorable for the expansion of Class I renewable energy development. CCAT compliments the Committee for its work and now seeks to provide refinement to address technologies for appropriate markets and end users to improve the effect and expected outcome of the Bill. In general, CCAT suggests a more uniform application of all Class I technologies with emphasis for those technologies manufactured in the state. For example, the application of fuel cell and hydrogen technologies that are engineered and manufactured in Connecticut can provide substantial opportunities for economic development and job creation, in addition to energy management and improved environmental performance. CCAT also suggests a more comprehensive scope to include transportation markets. This expansion may require the need to address additional energy service providers including natural gas, oil, and hydrogen companies. Such treatment appears to be warranted as residents are now facing high energy price increases for transportation services. CCAT does support the targeting of some technologies to certain end users, but a careful balancing of targets and end users will help to provide a favorable cost benefit ratio and allocation of resources. For example, it may be entirely appropriate to target solar PV technology to residential end users, but resources should also be fairly allocated for commercial CHP technology for Connecticut businesses and industries. These concerns may be addressed with the following general provisions:

***Uniform application of mechanisms to promote the development and use of Class I renewable energy should be based on tangible criteria for public benefit***

The use of provisions including direct incentives, long term power purchase contracts, tariffs, and utility investment would provide opportunities for long term investment to facilitate the development of Class I renewable energy sources to meet Connecticut's renewable portfolio standards (RPS) requirements. These provisions should be applied uniformly for all technologies with an emphasis for local manufacturing, job creation, minimal cost to the rate base, and maximum value. While we do not suggest fulfilling the state's RPS requirement exclusively with any one technology, we point out that fuel cell and hydrogen technology represents a viable Class I renewable technology that is built within the state and can effectively help meet the 2020 RPS goals taking into consideration feasibility, cost, fuel, and installation needs.

***Policies that support renewable energy technologies should be modeled and selected to provide long-term value that will reduce energy costs***

While solar energy and fuel cells are approximately the same cost on a \$/kW basis installed, fuel cells provide a significantly higher capacity utilization factor, which makes its capital cost per unit of energy delivered about one third that of a typical solar system. Furthermore, fuel cells have a high availability factor, and an overall efficiency approaching ninety percent.

***Technologies should create jobs and encourage economic development***

The hydrogen and fuel cell industry is a global economic driver and important to Connecticut. The Bill contains provisions that would increase the development of Class I renewable solar energy facilities and combined heat and power facilities, which will increase opportunities for economic development and job creation. However, jobs associated with the solar industry would be largely associated with installation and service. Hydrogen and fuel cell technology provides jobs in Connecticut for engineering, manufacturing, installation and service.

There are eight (8) original equipment manufacturers in the state that manufacture hydrogen and fuel cell technology that have combined revenue of approximately \$147 million dollars per year. These companies directly provide approximately 1,100 high tech jobs that contribute to Connecticut's economy. In addition, there are also over 500 companies in the state that are part of the hydrogen and fuel cell supply chain contributing an additional approximately 1,000 indirect and induced jobs in the state. According to a CCEF study completed by Navigant in

2009, fuel cell manufacturing (not including installation jobs) creates nearly 80 direct and indirect job -years per \$million of subsidy vs. 28 job-years for solar installation services.

***Technologies should provide both energy management and environmental benefits***

The development of Class I renewable solar energy facilities will provide additional public dividends to improve air quality. As a combined heat and power system, fuel cells could be used to displace energy from both conventional electric generation and inefficient boilers. The potential average annual emissions reductions for each MW of fuel cell capacity, compared to existing New England fossil fuel electric generation, would be approximately 8,750 lbs of NOx, 32,000 lbs of SOx, and 7 million lbs of CO2. The emission reductions would be substantially greater with the displacement of inefficient boilers and furnaces.

***Technologies should meet the needs of industry and residents***

It is entirely appropriate for certain technologies to be targeted for development at certain end uses. However, at this new beginning with a merger of the DPUC and DEP functions, it is entirely appropriate to address all residential, commercial, industrial, and transportation markets and to consider all fuels including electricity, natural gas, hydrogen, liquid fuels, and renewable energy. This comprehensive outlook may require an expansion of the vision and the mechanisms for implementation.

While CCAT is supportive of the concepts raised in this Bill to increase the development of Class I renewable energy sources in the State, we offer the following specific refinements for the Committee's consideration. Our intent is to provide additional long term benefits to the residents of this state with minimum appropriate investment.

***Sec. 1-45 et. seq.-*** CCAT is generally supportive of efforts to coordinate the activities of the DEP and DPUC and other agencies. This coordination will provide increased opportunities for comprehensive energy management in the transportation, industrial, commercial, and residential sectors, and provide an opportunity to consider management of a variety of fuels and energy sources.

CCAT is aware of the challenge in merging and coordinating these agencies, and also suggests that the Committee use this opportunity to include provisions to encourage the use of high efficiency transportation, which accounts for approximately 27 percent of the energy delivered in the United States.

*Sec. 46* – CCAT suggests that the Committee consider provisions to involve natural gas and/or petroleum providers to implement a transportation infrastructure program to support high efficiency transportation and alternative fuel vehicles, including natural gas, hydrogen fueled, and electric vehicles.

*Sec. 48 and 49* – CCAT suggests that the Committee consider provisions to include the use of high efficiency transportation and alternative fuels within the energy procurement plan.

*Sec. 50* - CCAT suggests that the Committee consider expanding the resources of the purchasing pool to address the bulk purchase of natural gas and perhaps hydrogen.

*Sec. 51* – CCAT is in agreement that this initiative targeted to municipalities is appropriate and potentially consistent with “Energy Improvement District” policy.

*Sec. 56* - CCAT is in agreement to establish an annual cost cap; however, the funds which would be used to support the development of renewable energy, should be made applicable to all renewable technologies.

*Sec. 57* - CCAT is in support of this PV focused program to encourage the development of renewable energy facilities for the residential sector. CCAT would encourage the Committee to consider including all renewables that provide a favorable cost/benefit ratio.

*Sec. 58* – CCAT is in agreement for the measured use of long term power purchase agreements with development targets, but this provision should be extended to all renewable energy technologies.

*Sec. 59 and 60* – CCAT supports the concept of a solicitation plan and a feasibility survey, but suggests consideration for all renewable technologies.

*Sec. 61* - CCAT supports the concept of a feed-in tariff to promote the development of renewable energy facilities. We are aware of Sec. 89, but are not aware of the purpose for the somewhat disparate treatment of technologies, including development targets, use of ratepayer funds, and potential utility ownership of certain solar assets, which are not available to other renewable energy technologies. CCAT recommends uniform treatment of technologies for this section and the technologies in Sec. 89.

*Sec. 62* – CCAT is supportive of self-supporting markets for electric, natural gas, and fuel oil customers. CCAT suggests that this section be clarified to include transportation markets.

*Sec. 63* - CCAT strongly supports this provision to provide an additional incentive for technologies manufactured in the state as an initiative to bolster the Connecticut job market.

*Sec. 65* – CCAT supports this residential initiative as a comprehensive measure that is technology neutral and targeted to an appropriate end use.

*Sec. 66* – CCAT supports this provision for a procurement plan, but suggests consideration to address other energy markets, including natural gas and hydrogen.

*Sec. 68, 69, and 75* - CCAT supports these provisions for combined heat and power and gas conservation.

*Sec. 78 and 79* - CCAT supports this initiative as a comprehensive measure that is technology neutral and targeted to an appropriate end use.

*Sec. 80 (24)* – CCAT is a contractor to the U.S. Department of Energy, the Small Business Administration, the Connecticut Department of Economic and Community Development, and has worked with the Connecticut Departments of Environmental Protection and Public Utility Control and the Connecticut Siting Council. CCAT supports the efforts of the Connecticut Academy of Science and Engineering and would also seek to be recognized as a resource to further the purposes of the corporation.

*Sec. 83* – CCAT supports this targeted program to manage agricultural waste with combined heat and power technology.

*Sec. 89* – CCAT supports this section, but requests that it be implemented fairly with terms similar to Sec . 61.

*Sec. 90 and 91* – CCAT supports this section for combined heat and power, but suggests additional flexibility for financial incentives to be of long-term benefit when compared to cost.

*Sec. 93* – CCAT supports this process and suggests additional flexibility to consider hydrogen, electrochemical energy storage, and fuel processing.

### *Conclusion*

This Bill will help meet the state's RPS requirements and greenhouse gas reduction goals. Solar, fuel cells, wind, hydropower, biomass, and other renewables will all be needed to meet energy and clean air requirements for the state. Hydrogen and fuel cell technology and other renewable technologies manufactured in Connecticut needs to be an important part of the solution. Applying the concepts identified in the Bill to all Class I renewable energy technologies would increase opportunities for renewable technology development in the state at facilities and end uses that require low cost, high environmental performance, high reliability, a high availability factor, and could provide substantial opportunities for economic development and job creation.

CCAT will make itself available to the Committee and legislature upon request to assist in the refinement of this legislation.

Respectfully submitted,

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